We claim:

1. A composite scaffold, comprising:

a ceramic phase having a first plurality of pores;

a polymer phase having a second plurality of pores, said polymer phase attached to said ceramic phase at an interphase region, said polymer phase infused at least partially into said first plurality of pores in said interphase region.

2. The scaffold of Claim 1, wherein said polymer phase in said interphase region has a portion of said second plurality of pores.

3. The scaffold of Claim 2, wherein said portion of said second plurality of pores communicate at least partially with said first plurality of pores in said interphase region.

4. The scaffold of Claim 3, wherein said pores of said first plurality of pores are larger than said pores of said second plurality of pores.

5. The scaffold of Claim 4, wherein said polymer phase is a polymer foam.

6. The scaffold of Claim 5, wherein said ceramic phase is a first said ceramic phase and said interphase region is a first said interphase region and further including a second said ceramic phase attached to said polymer phase distal to said first ceramic phase through a second said interphase region distal to said first interphase region.

7. The scaffold of Claim 6, further including a mechanical reinforcement structure embedded in said polymer phase.

8. The scaffold of Claim 7, wherein said reinforcement structure is a PDS mesh ring extending generally perpendicularly between said first ceramic phase and said second ceramic phase, said ring inserting partially into a channel formed in adjacent faces of said first and second ceramic phases, thereby

extending into said first and second interphase zones.

9. The scaffold of Claim 1, further including a mechanical reinforcement structure embedded in said polymer phase, said mechanical reinforcement structure selected from the group consisting of films, scrims, woven textiles, non-woven textiles, knitted textiles, braided textiles and trusses.

10. The scaffold of Claim 1, further including fillers within said polymer phase selected from the group consisting of growth factors and therapeutic materials.

11. The scaffold of Claim 1, further including living cells residing on a surface of said scaffold.

12. The scaffold of Claim 1, wherein at least one of said polymer phase and said ceramic phase is biodegradable.

13. The scaffold of Claim 1, wherein said ceramic is selected from the group consisting of hydroxyapatite, tricalcium phosphate, tetracalcium phosphate, fluoroapatite, magnesium calcium phosphate, calcium sulfate, calcium fluoride, calcium oxide and calcium carbonate.

14. The scaffold of Claim 1, wherein said polymer is a biopolymer selected from the group consisting of collagen, elastin, hyaluronic acid, chitin and alginate.

15. The scaffold of Claim 1, wherein said polymer is selected from the group consisting of aliphatic polyester homopolymers and aliphatic polyester copolymers.

16. The scaffold of Claim 15, wherein said polymer is selected from the group consisting of lactic acid, lactide mixtures of L-, D-, meso and D,L lactides, glycolic acid, glycolide, epsilon-caprolactone, p-dioxanone (1,4-dioxan-2-one) and trimethylene carbonate (1,3-dioxan-2-one).

17. The scaffold of Claim 1, wherein said polymer is an aliphatic polyester elastomeric copolymer.

18. The scaffold of Claim 17, wherein said copolymer is formed from epsilon-caprolactone and glycolide in a mole ratio of from about 35:65 to about 65:35.

19. The scaffold of Claim 17, wherein said copolymer is formed from epsilon-caprolactone and glycolide in a mole ratio of from about 45:55 to about 35:65.

20. The scaffold of Claim 17, wherein said copolymer is formed from epsilon-caprolactone and lactide selected from the group consisting of L-lactide, D-lactide and lactic acid copolymers in a mole ratio of epsilon-caprolactone to lactide of from about 35:65 to about 65:35.

21. The scaffold of Claim 17, wherein said copolymer is formed from epsilon-caprolactone and lactide selected from the group consisting of L-lactide, D-lactide and lactic acid copolymers in a mole ratio of epsilon-caprolactone to lactide of from about 45:55 to about 30:70.

22. The scaffold of Claim 17, wherein said copolymer is formed from epsilon-caprolactone and lactide selected from the group consisting of L-lactide, D-lactide and lactic acid copolymers in a mole ratio of epsilon-caprolactone to lactide of from about 95:5 to about 85:15.

23. A method for making a composite scaffold having a porous ceramic phase and a porous polymer phase, comprising the steps of:

(A) providing a porous ceramic body;

(B) providing a polymer solution;

(C) placing said porous ceramic body in contact with said polymer solution;

(D) permitting said polymer solution to at least partially infuse into pores in said ceramic body;

(E) foaming said polymer solution to produce a polymer foam thereby forming the porous polymer phase, the polymer phase interlocking with the ceramic body where the polymer solution was permitted to infuse into the ceramic body.

24. The method of Claim 23, wherein said step of foaming is by lyophilization.

25. A method for repairing a defect area at the gradient junction of cartilaginous tissue and bony tissue, comprising the steps of:

(A) providing a composite scaffold with a porous ceramic phase, a porous polymer phase, the polymer phase attached to the ceramic phase at an interphase region where the polymer phase is at least partially infused into the ceramic phase mechanically interlocking the ceramic and polymer phases, with the porosity of the ceramic and polymer phases communicating;

(B) boring a receptacle space in the gradient junction at the site of the injury to receive the scaffold provided in step (A);

(C) placing and securing the scaffold in the receptacle space with the ceramic phase adjacent to the bony tissue and the polymer phase adjacent to the cartilaginous tissue.

26. The method of Claim 25, wherein the gradient junction is that of articular cartilage.

27. The method of Claim 25, wherein the gradient junction is that of a spinal disc.

28. The method of Claim 25, wherein the gradient is that of the meniscus.